

Unlocking the Future of Power Systems

Shaping the Grid Beyond Traditional Boundaries with IEC 61850 Standard



Enhancing Power Systems with IEC 61850 Interoperability

The energy system is evolving from one-way power flows to dynamic, multidirectional grids. Interoperable systems are being adopted by industries at an increasing rate to ensure reliable power integration and a stable electricity supply. The growth of DER requires real-time monitoring, grid coordination, and demand-supply balancing. Designed initially for substations, the IEC 61850 standard has become a key reference for compatibility in modern power systems. Key Applications:

Renewable Energy:

Integrating wind and solar power seamlessly into the grid.

Distributed Energy Resource Management System (DERMS):

Enabling real-time monitoring, microgrid coordination, and dynamic grid adjustments using protocols like IEC 61850 XXMP.

Substations:

Supporting automation and real-time communication to enhance grid reliability

Energy Storage:

Facilitating efficient management and deployment of battery energy storage systems (BESS)

Data Centers:

Meeting the growing energy demands of large-scale facilities.

Railway Transportation:

Ensuring consistent power for traction substations and urban transit.

Moxa's Expertise Helps Advance Energy Diversity

9,200+

Substation network deployments in transmission and distribution systems

28 GWh+

Energy Storage System managed

7 Out of 10

Top global wind turbine players are deploying Moxa solutions

52+ GW

Solar energy monitored by Moxa's device connectivity solutions

Modern Energy Systems Hurdles

Modernizing substations and multidirectional communication in the energy system present a set of challenges:

Interoperability

Diverse vendors and protocols often create integration barriers, complicating communication between devices.



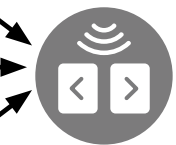
Data Management and Monitoring

Managing the massive data flows required demands fast and reliable exchange. Inefficient systems can disrupt the integration of smart grid components.



Scalability

The lack of a flexible system design restricts the integrate of new technologies, limits scalability, and reduce the reliability and efficiency of smart grid operations.



Modernizing
Energy Systems

A Universal Standard for Energy Integration

IEC 61850 provides a unified, open, and non-proprietary standard for communication across diverse energy applications. IEC 61850 delivers three key benefits:



★ Standardized Communication

Supporting Ethernet-based communication, the standard defines protocols such as MMS, GOOSE, and Sampled Measured Values (SMV) to streamline device communication and enhance system efficiency.



★ Validated Interoperability

With rigorous testing and validation standards, IEC 61850 ensures seamless integration of hardware from multiple vendors, simplifying system upgrades and modernization.



★ Unified Data Model for Consistency

The Logical Node (LN) model offers a standardized structure and language, improving data consistency and enabling real-time operations across energy systems.

From Core to Shell: Reliable Connectivity, Rugged Performance

Moxa's communication product solutions not only fulfill **IEC 61850 communication** protocols but also comply with **IEC 61850-3 Edition 2 standards**. These stringent requirements ensure:

Moxa's IEC 61850-3 Offering



Environmental Tolerance:

- Ensure devices operate reliably from -40°C to 75°C



Mechanical Strength:

- Built to endure constant vibration and shock



Electrical Resilience:

- Built-in insulation and overvoltage protection (Level 4) for enhanced safety and reliability.
- Advanced electromagnetic compatibility to prevent interference and ensure uninterrupted data transmission.

IEC 61850-3 devices are essential for the reliable operation of critical infrastructure like substations and power plants, including renewable energy and microgrid systems, in harsh environments.

Why Moxa

Moxa's comprehensive IEC 61850 product portfolio combines advanced communication capabilities and rugged hardware design empower utility operators, energy companies, and industrial players to achieve reliable, scalable, and future-proof power systems.

Industrial Ethernet Switches

DIN-rail Managed Switches

| SERIES/MODELS | | IEC 61850-3 |
|-----------------------|---|-------------|
| PT-G510 | 10-port Layer 2 full Gigabit PRP/HSR managed Ethernet switches | ● |
| PT-G503 | 3-port full Gigabit managed redundancy boxes | ● |
| PT-510 | 10-port Layer 2 DIN-rail managed Ethernet switches | ● |
| PT-508 | 8-port Layer 2 DIN-rail managed Ethernet switches | ● |
| EDS-G4014 | 8G+6 2.5GbE-port full Gigabit managed (LV & PoE models) Ethernet switches | ● |
| EDS-G4012 | 12G-port (with 8 802.3bt PoE port option) full (LV & PoE models) Gigabit manage | ● |
| EDS-G4008 | 8+4G+2 2.5GbE-port managed Ethernet switches | ● |
| EDS-4014 | 8+4G+2 2.5GbE-port managed Ethernet switches | ● |
| EDS-4012 | 8+4G-port (with 8 802.3bt PoE port option) (LV & PoE models) managed Ethernet | ● |
| EDS-4009 | 9-port managed Ethernet switches | ● |
| EDS-4008 | 8-port (with options of 4 802.3bt PoE ports or 4 Giga (LV & PoE models) uplink ports) managed Ethernet switches | ● |
| EDS-G508E/G512E/G516E | Full Gigabit managed Ethernet switches | ● |
| EDS-528E | 24+4G-port Gigabit managed Ethernet switches | ● |
| EDS-518E | 14+4G-port Gigabit managed Ethernet switches | ● |
| EDS-510E | 7+3G-port Gigabit managed Ethernet switches | ● |
| MDS-G4028-4XGS | 4XG+24G-port full Gigabit modular managed Ethernet switches | ● |
| MDS-G4020-4XGS | 4XG+16G-port full Gigabit modular managed Ethernet switches | ● |
| MDS-G4012-4XGS | 4XG+8G-port full Gigabit modular managed Ethernet switches | ● |
| MDS-G4028 | 28G-port full Gigabit modular managed Ethernet switches | ● |
| MDS-G4020 | 20G-port full Gigabit modular managed Ethernet switches | ● |
| MDS-G4012 | 12G-port full Gigabit managed Ethernet switches | ● |

Industrial Ethernet Switches

Rackmount Managed Switches

| SERIES/MODELS | | IEC 61850-3 |
|---------------|---|-------------|
| PT-G7828 | 28-port Layer 3 full Gigabit modular managed Ethernet switches | ● |
| PT-G7728 | 28-port Layer 2 full Gigabit modular managed Ethernet switches | ● |
| PT-7528 | 28-port Layer 2 managed rackmount Ethernet switches | ● |
| RKS-G4028 | 28G-port (with 802.3bt PoE option) full Gigabit modular managed Ethernet switches | ● |

PoE Switches

| SERIES/MODELS | | IEC 61850-3 |
|----------------|--|-------------|
| EDS-G4012 | 12G-port full Gigabit managed Ethernet switches with an 8 802.3bt PoE port option | ● |
| EDS-4012 | 8+4G-port managed Ethernet switches with an 8 802.3bt PoE port option | ● |
| EDS-4008 | 8-port managed Ethernet switches with options of 4 802.3bt PoE ports or 4 Gigabit uplink ports | ● |
| EDS-G512E | 12G-port (with 8 PoE+ ports option) full Gigabit managed Ethernet switches | ● |
| EDS-P506E-4PoE | 4+2G-port Gigabit PoE+ managed Ethernet switches with 4 IEEE 802.3af/at PoE+ ports | ● |
| MDS-G4028-4XGS | 4XG+24G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option | ● |
| MDS-G4020-4XGS | 4XG+16G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option | ● |
| MDS-G4012-4XGS | 4XG+8G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option | ● |
| MDS-G4028 | 28G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option | ● |
| MDS-G4020 | 20G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option | ● |
| MDS-G4012 | 12G-port full Gigabit managed Ethernet switches with an 8 802.3at/af PoE+ port option | ● |
| RKS-G4028 | 28G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option | ● |

Industrial Secure Routers

| SERIES/MODELS | | IEC 61850-3 |
|---------------|--|-------------|
| EDR-G9010 | 8 GbE copper + 2 GbE SFP multiport industrial secure router | ● |
| EDR-G9004 | 2 Gigabit copper + 2 Gigabit copper/SFP combo port industrial secure routers | ● |
| EDR-8010 | 8 FE copper and 2 GbE SFP multiport industrial secure routers | ● |

Industrial x86 Computer

| SERIES/MODELS | | IEC 61850-3 |
|---------------|--|-------------|
| DA-680 | Intel® 8th Gen Core™ processor, 1U rackmount computers with 8 Gigabit Ethernet ports, 8 to 16 serial ports | ● |
| DA-681C | Intel® 7th Gen Core™ processor, 1U rackmount computers with 6 Gigabit Ethernet ports, 12 isolated serial ports | ● |
| DA-682C | Intel® 7th Gen Core™ processor, 2U rackmount computers with 2 expansion slots | ● |
| DA-720 | Intel® 6th Gen Core™ processor, 2U rackmount computers with 3 PCIe expansion slots | ● |
| DA-820C | Intel® 7th Gen Xeon® and Core™ processor, 3U rackmount computers with PRP/HSR card support | ● |
| DA-820E | Intel® 13th Gen Xeon® and Core™ processor, 3U rackmount computers, hot-swappable power module, -40 to 70°C operating temperature | ● |

Industrial Ethernet Gateways

| SERIES/MODELS | | IEC 61850-3 |
|---------------|--|-------------|
| MGate 5119 | 1-port DNP3/IEC 101/IEC 104/Modbus-to-IEC 61850 gateways | ● |
| MGate 5192 | 1-port IEC 61850-to-DNP3/IEC 101/IEC 104/Modbus gateways | ● |

Industrial Serial Device Servers

| SERIES/MODELS | | IEC 61850-3 |
|---------------|---|-------------|
| NPort S9450I | 4-port rugged device servers with managed Ethernet switch | ● |
| NPort S9650I | 8/16-port rugged device server with managed Ethernet switch | ● |



Your Trusted Partner in Automation

Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With 35 years of industry experience, Moxa has connected more than 102 million devices worldwide and has a distribution and service network that reaches customers in more than 85 countries. Moxa delivers lasting business value by empowering industries with reliable networks and sincere service. Information about Moxa's solutions is available at www.moxa.com.

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Industrial NMS



Industrial Ethernet
Switches Secure Routers



Industrial Wireless



Serial Device
Server



Industrial
Computers



Protocol Gateways



I/O